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IN THE CLAIMS:

1. **(Currently Amended)** A data communications system, comprising:

a plurality of individually modulated ~~transmission~~ carriers; and

a receiver that includes a front-end that receives said modulated carriers, and a synchronization processor that develops an offset measure between a clock employed in creating said modulated transmission carriers and a clock of said receiver by, in frequency domain, processing phases of said plurality of received modulated carriers ~~one or more receivers, where each receiver has advance knowledge of relationships between phases of a transmitter's unmodulated carriers; and a means to synchronize signals between the transmitter and receivers, based on an inherent structure in the frequency domain representation of the received waveform, without additional 'pilot' signals, synchronization patterns, or other special synchronization signals or waveforms~~.

2. **(Currently Amended)** The system of claim **1**, where said offset is a timing offset, and said processing operates on a plurality of pairs of said received modulated carriers, taking account of frequency separation between carriers within each of said pairs ~~the transmitter's and receivers' signals' sample timing is being synchronized~~.

3. **(Original)** The system of claim **2**, where the individually modulated transmission carriers are Orthogonal Frequency Division Multiplexed carriers.

4. **(Currently Amended)** The system of claim **2** where said processing on said plurality of pairs develops a set of results, and develops said timing offset from the set of results ~~the frequency domain representation of the received signal is a form of the Fourier Transform~~.

5. **(Currently Amended)** The system of claim **4**, where carriers of a pair in said pairs are adjacent to each other in the frequency domain ~~the form of the Fourier Transform is the Fast Fourier Transform~~.

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6. **(Currently Amended)** The system of claim ~~2~~ 4, where carriers of a pair in said pairs are equally spaced in the frequency domain, but not adjacent to each other ~~the structure of the frequency domain representation is the collective phase relationships between a plurality of individual carriers~~.

7. **(Currently Amended)** The system of claim **6** where the processor, in computing the timing offset, computes ~~means to synchronize the timing of signals is based on computing the~~ differences in phase between said received ~~a plurality of individual~~ carriers.

A'cnt.

8. **(Currently Amended)** The system of claim ~~7~~ 4, where carriers of a pair in said pairs are not equally spaced in the frequency domain ~~the means to compute the differences in phase between individual carriers is by using a differential in frequency detection scheme~~.

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17. (Delete) .

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19. (Currently Amended) The system of claim ~~18~~ 4 where said timing offset between any pair of modulated carriers is developed ~~the means to remove the carriers' data modulation is~~ by raising the complex representation of the modulated carriers ~~amplitude and phase~~ to an integer power.

A1 Cont

20. (Currently Amended) The system of claim **19** where the ~~modulation of the~~ carriers are modulated ~~is~~ by an N-level phase modulation schema, and the ~~data modulation is removed by raising the complex representation of~~ the carriers are raised ~~amplitude and phase~~ to the N^{th} power.

21. (Currently Amended) The system of claim **20** where the modulation is Quadrature Phase Shift Keying and ~~the data modulation is removed by raising the complex representation of~~ the carriers are raised ~~amplitude and phase~~ to the fourth power.

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26. (Currently Amended) The system of claim 1 ~~22~~ where the means to synchronize the operating frequency is based on computing the phases of a plurality of said received modulated ~~individual~~ carriers.

27. (Original) The system of claim **26** where the plurality of carriers are used in combination to determine the synchronization with the contribution of each carrier weighted according to its accuracy.

28. (Original) The system of claim **27** where the accuracy of each carrier's contribution is determined based on the carrier's amplitude.

A1 Cont

29. (Currently Amended) The system of claim **28** where, for each carrier, the carrier's amplitude and phase, represented by a complex number in a Cartesian coordinate system, is summed with the other carriers' complex representation to yield a composite vector ~~sum~~, representing the composite amplitude and phase; said processor further employing ~~and a means to use~~ the phase of this composite vector to create a frequency synchronization signal.

30. (Original) The system of claim **29** where the carriers' modulating data signals are known by the receivers and can be used to determine the precise transmitter carriers' phases.

31. (Original) The system of claim **29** where the carriers' modulating data signals are not known by the receivers but can be estimated by attempting to demodulate the carriers and then used to estimate the transmit carriers' phases.

32. (Original) The system of claim **29** where the carriers' modulating data signals are not known by the receivers but where the effect of the modulation can be removed from the carriers without demodulating the carriers.

33. (Original) The system of claim **32** where the means to remove the carriers' data modulation is by raising the complex representation of the carrier amplitude and phase to an integer power.

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34. (Original) The system of claim **33** where the modulation of the carriers is by N level phase modulation and the data modulation is removed by raising the complex representation of the carrier amplitude and phase to the N^{th} power.

35. (Original) The system of claim **34** where the modulation is Quadrature Phase Shift Keying and the data modulation is removed by raising the complex representation of the carrier amplitude and phase to the fourth power.

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39. (Previously Withdrawn) .

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43. (Previously Withdrawn) .

44. (Currently Amended) A method in ~~In~~ a data communications system~~,~~ that includes ~~including~~ a plurality of individually modulated ~~transmission~~ carriers, ~~the method~~ comprising the steps of:

receiving in a receiver said plurality of individually modulated carriers,

developing in said receiver a synchronizing signal from computed phases in the frequency domain of said individually modulated carriers; and

applying said synchronizing signal to synchronize the plurality of modulated carriers that are received by said receiver

~~storing information about relationships between a plurality of transmission carrier phases in their unmodulated states at one or more receivers; and~~

~~synchronizing signals between the transmitter and receivers, based on an inherent structure in the frequency domain representation of the received waveform, without additional 'pilot' signals, synchronization patterns, or other special synchronization signals or waveforms.~~

45. **(Currently Amended)** The method of claim **44**, where the ~~transmitter's and receivers' signals'~~ sample timing of said received carriers is being synchronized.

A1 Cont.

46. **(Original)** The method of claim **45**, where the individually modulated transmission carriers are Orthogonal Frequency Division Multiplexed carriers.

47. **(Original)** The method of claim **45**, where the frequency domain representation of the received signal is a form of the Fourier Transform.

48. **(Original)** The method of claim **47**, where the form of the Fourier Transform is the Fast Fourier Transform.

49. **(Original)** The method of claim **45**, where the structure of the frequency domain representation is the collective phase relationships between a plurality of individual carriers.

50. **(Original)** The method of claim **49**, where the synchronizing of the timing of signals is based on computing the differences in phase between a plurality of individual carriers.

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51. (Original) The method of claim **50**, where computing of the differences in phase between individual carriers is by using a differential-in-frequency detection scheme.

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53. (Original) The method of claim **50** where the plurality of carriers used are adjacent in frequency.

A1 Cont.

54. (Original) The method of claim **50** where the plurality of carriers used is equally spaced but not adjacent.

55. (Original) The method of claim **50** where the plurality of carriers used may not be equally spaced but may be arbitrarily selected by the receivers.

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60. (Currently Amended) The method of claim 44 ~~58~~ where data that modulates the carriers~~' modulating data signals are~~ is not known by the receivers, but can be estimated by attempting to demodulate the carriers and then using the derived modulating data to estimate the transmit carriers' phases.

61. (Currently Amended) The method of claim **44** ~~58~~ where data that modulates the carriers~~' modulating data signals are~~ is not known by the receivers, but

where the effect of the modulation can be removed from the carriers without demodulating the carriers.

62. (Original) The method of claim **61** where the means to remove the carriers' data modulation is by raising the complex representation of the carrier amplitude and phase to an integer power.

63. (Original) The method of claim **62** where the modulation of the carriers is by N level phase modulation and the data modulation is removed by raising the complex representation of the carrier amplitude and phase to the N^{th} power.

A1 Cont.

64. (Original) The method of claim **63** where the modulation is Quadrature Phase Shift Keying and the data modulation is removed by raising the complex representation of the carrier amplitude and phase to the fourth power.

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